Annals of The Royal College of Surgeons of England (1993) *vol.* 75, 437–439

Intraperitoneal bupivacaine for effective pain relief after laparoscopic cholecystectomy

Tarig Chundrigar FRCS
Surgical Registrar

Russ Morris FFARCS
Consultant Anaesthetist

A Richard Hedges MS FRCS
Consultant Surgeon

Jeffrey D Stamatakis MS FRCS
Consultant Surgeon

Princess of Wales Hospital, Bridgend, Mid Glamorgan

Key words: Cholecystectomy; Laparoscopy; Prospective trial; Pain

Laparoscopic cholecystectomy is now widely practised. There are various methods of pain relief used but none has been assessed or compared following this procedure. We have assessed the analgesic effect of intraperitoneal bupivacaine in laparoscopic cholecystectomy.

Sixty consecutive patients were randomly assigned to one of two groups. Patients in group 1 were given 20 ml of saline injected under vision into the region of the gallbladder bed. Patients in group 2 were given 20 ml of 0.25% bupivacaine in a similar fashion. Postoperative pain was assessed with a visual analogue pain scale and the site of pain was recorded. Patients in the bupivacaine group had less pain in the early postoperative period and a lower incidence of pain in the right hypochondrium.

Intraperitoneal bupivacaine is a simple and effective treatment for postoperative pain after laparoscopic cholecystectomy.

Laparoscopic cholecystectomy is an established form of treatment for patients with symptomatic gallstone disease. As the method is relatively new there is no general agreement on effective postoperative pain control. Methods used to date include non-steroidal, anti-inflammatory, analgesic suppository *(1)*, infiltration of wounds with local anaesthetic *(1,2)*, and intermittent, intramuscular narcotics *(2,3)*. None of these methods has been assessed or compared in laparoscopic cholecystectomy. It is recognised that after laparoscopy shoulder-tip pain is a common complaint and may delay discharge from hospital *(4)*. This symptom in patients undergoing laparoscopy for gynaecological reasons may be reduced by intraperitoneal administration of local anaesthetic *(5)*. It was decided to measure the effectiveness of this simple method of administration of local anaesthetic on postoperative pain relief in patients undergoing laparoscopic cholecystectomy.

Correspondence to: Mr A Richard Hedges, Consultant Surgeon, The Princess of Wales Hospital, Coity Road, Bridgend, Mid Glamorgan CF31 1RQ

Patients and methods

The study comprised 60 consecutive patients listed for elective laparoscopic cholecystectomy under the care of two surgeons (ARH and JDS) for symptomatic gallstone disease who gave informed consent. The patients received no premedication. General anaesthesia consisted of induction with propofol (2 mg/kg) plus 2.5 mg droperidol. Atracurium was used for muscle relaxation, followed by intubation and maintenance with oxygen, nitrous oxide and enflurane. Morphine was given intravenously in 1 mg boluses (0.1 mg/kg) for intraoperative analgesia. All operations were performed by the two consultant surgeons using the same four-port technique which involved direct visual access to the peritoneum for insufflation, no irrigation, no postoperative drainage, and deflation of the pneumoperitoneum via the epigastric cannula placed above the right lobe of the liver. Before deflation patients were randomly allocated to receive either 20 ml of saline or 20 ml of 0.25% bupivacaine administered via the epigastric cannula into the region of the gallbladder bed. The solutions were given and subsequent assessment was performed in a double-blind fashion. Patients were assessed for pain using a visual analogue pain scale at five time intervals after surgery; 1 h, 2 h, 4 h, 8 h and at discharge. The site of pain was

also recorded as shoulder-tip, right hypochondrial, umbilical or generalised abdominal, at the same time intervals. Postoperative pain relief was given as intermittent, intramuscular Cyclimorph® (morphine 10 mg, cyclizine 50 mg) or orally as two co-proxamol tablets (dextropropoxyphene 32.5 mg, paracetamol 325 mg) as required and assessed by the nursing staff. All patients were cared for on the same ward. The amount of analgesics consumed was recorded.

Statistical analysis was by a χ^2 test (with Yates' correction) and Student's *t* test of significance.

Results

Sixty patients were entered into the study and of these two were excluded as conversion to open cholecystectomy was necessary in both cases because of dense inflammatory adhesions. The results from the remaining 58 patients were analysed.

The characteristics of the two patient groups, including factors likely to increase postoperative pain, such as bile spillage from punctured gallbladder, or difficult dissection due to adhesions from previous surgery, are shown in Table I. There was no difference in characteristics between these groups.

The results of the visual analogue pain scores are shown in Table II. There was a significant reduction in pain scores at the 1 h (4.00 *vs* 1.99, $P<0.01$) and 2 h (2.53 *vs* 1.23, $P<0.05$) time intervals after laparoscopic surgery. By 4 h, and at subsequent time intervals pain scores were low in both groups and no significant difference was found. Of the patients, 54 were discharged the morning after surgery and the remaining four patients (two in the saline and two in the bupivacaine group) were discharged the same evening.

Table I. Characteristics of patients in the two groups

	Saline	*Bupivacaine*
Number in group	30	28
Age (years)*	48 (16.9)	47 (14.5)
Male:female ratio	3:27	2:26
Previous surgery	5	6
Gallbladder puncture	2	2
Length of operation (min)*	49.0 (18.9)	48.5 (14.4)

* Mean (± SD)

Table II. Visual analogue pain scores in the two groups*

	Time after surgery				
	1 h	*2 h*	*4 h*	*8 h*	*Discharge*
Saline	4.00	2.53	2.37	1.69	0.08
Bupivacaine	1.99	1.23	2.61	1.52	0.12
P†	<0.01	<0.05	NS	NS	NS

* Mean pain scores † Student's *t* test

Table III. Number of patients in each group with pain at the four sites recorded after operation

	Time after surgery				
	1 h	*2 h*	*4 h*	*8 h*	*Discharge*
Shoulder-tip					
Saline	2	1	1	2	1
Bupivacaine	0	1	2	5	2
Right hypochondrial					
Saline	4	8	5	5	1
Bupivacaine	3	1*	5	3	0
Umbilical					
Saline	3	3	3	1	0
Bupivacaine	3	2	4	2	0
Generalised abdominal					
Saline	10	6	8	5	0
Bupivacaine	7	7	11	8	0

* $P<0.05$ (χ^2 with Yates' correction)

The results showing the site of postoperative pain are given in Table III. There were significantly fewer patients with pain in the right hypochondrium 2 h after operation in the bupivacaine group (8 *vs* 1, $P<0.05$), but no difference in numbers of patients with pain at the other recorded sites.

There was no difference in total analgesic consumption between the groups (saline 360 mg Cyclimorph *vs* bupivacaine 320 mg Cyclimorph; saline 70 co-proxamol tablets *vs* bupivacaine 54 co-proxamol tablets).

Discussion

This study demonstrates that in laparoscopic cholecystectomy, intraperitoneal administration of bupivacaine is effective in reducing pain in the early postoperative period. The site of pain experienced was recorded because previous studies in gynaecology patients reported shoulder-tip pain as a frequent problem (35–63%) (*4*). This symptom was not commonly reported in this study, the greatest incidence was seven of 58 (12%) patients at 8 h after operation. It is thought that shoulder-tip pain results from carbon dioxide gas trapped beneath the right hemidiaphragm after deflation of the abdomen (*6*). In all our cases the abdomen was deflated through the epigastric cannula, the tip of which was placed above the right lobe of the liver to allow all gas in this region to escape. This may, in part, explain the low incidence of this symptom.

Despite the reduction in pain in the bupivacaine group there was no overall difference in analgesic consumption. A difference was probably not seen because the overall level of analgesic consumption in the two groups was small. All patients received a dose of Cyclimorph in recovery; six patients in the saline group and four

patients in the bupivacaine group required a second dose. No patient required three doses.

We conclude that intraperitoneal bupivacaine reduces pain in the initial postoperative period after laparoscopic cholecystectomy, it is easy to administer, with no adverse effects, and may become routine practice for those performing this procedure.

References

1 Lord McColl. Laparoscopic cholecystectomy. *Ann R Coll Surg Engl* 1992; **74**: 231.

2 Rees BI, Williams HR. Laparoscopic cholecystectomy: the first 155 patients. *Ann R Coll Surg Engl* 1992; **74**: 233–6.

3 Scott ADN, Greville AC, McMillan L, Wellwood JMcK. Laparoscopic laser cholecystectomy: results of the technique in 210 patients. *Ann R Coll Surg Engl* 1992; **74**: 237–41.

4 Dobbs FF, Kumar V, Alexander JI, Hull MGR. Pain after laparoscopy related to posture and ring versus clip sterilisation. *Br J Obstet Gynaecol* 1987; **94**: 262–6.

5 Narchi P, Benhamou D, Fernandez H. Intraperitoneal local anaesthetic for shoulder pain after day-case laparoscopy. *Lancet* 1991; **338**: 1569–70.

6 Edwards ND, Barclay K, Catling SJ, Martin DG, Morgan RH. Day case laparoscopy: a survey of postoperative pain and an assessment of the value of diclofenac. *Anaesthesia* 1991; **46**: 1077–80.

Received 11 January 1993